

Application No. 09/771,809  
Amdt. Dated August 22, 2005  
Reply to Office Action of July 26, 2005

### REMARKS

Applicant respectfully requests that the Examiner reconsider the above-identified patent application in light of the Amendment and following Remarks.

Applicant filed a Request for Continued Examination under 37 CFR 1.114 on May 4, 2005 before paying the Issue Fee and submitted an Information Disclosure Statement in compliance with the duty of disclosure under 37 C.F.R. 1.56. The Examiner reopened prosecution in this application and entered Applicant's submission.

Claims 8-11 are pending; claims 1-7 have been withdrawn as directed to nonelected subject matter.

The Examiner objected to Claim 8, which contained a typographical error. The typographical error in claim 8 at line 2 has been corrected. Applicant respectfully requests that the Examiner withdraw this objection.

The Examiner rejected claims 8-11 under 35 U.S.C. §102(e) as anticipated by, or, in the alternative, under 35 U.S.C. §103(a) as obvious over, U.S. Pat. No. 6,165,641, issued to Striebel ('641 Patent) on the ground that the '641 patent teaches or at least suggests a lithium titanate intercalation compound. The Examiner stated that the '641 Patent teaches a lithium intercalation battery, which by definition intercalates lithium ions (citing Col. 2, line 21 et seq). The Examiner further stated that both the anode and cathode have respective active materials (col. 5, lines 13-19). The Examiner further stated that the anode is chosen from titanium and iron and that the mobile ion source material is lithium *inter alia* (citing Col. 4, lines 41-44). The Examiner further stated that the active materials comprise particles having a small grain size (citing line 42). The Examiner further stated that the '641 Patent discloses data from an X-ray

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diffraction taken of the material, which "suggest[s] that the size of any crystalline compound is less than about 10 nm." The Examiner concluded that these data teaches or at least suggests to the skilled artisan that the material would naturally flow to have a particle size of less than 100 nm, absent a showing by Applicant that the claimed invention distinguishes over the reference. The Examiner further stated that although claim 9 recites product-by-process limitations of heating, holding and cooling of a mixture, *inter alia* to obtain the instant lithium titanate intercalation compound, these process limitations have not been given patentable weight as the limitations do not give breadth or scope to the product claim. The Examiner reasoned that the claimed product appears to be the same or similar to the prior art product insofar as being a lithium intercalation battery active material having a particle size of less than 100 nm. The Examiner concluded that in the event that any differences can be shown by the product of the product-by-process claim 9, such differences would have been obvious to the skilled artisan as a routine modification of the product absent a showing of unexpected results.

First, anticipation requires that each and every element of the claims be disclosed, either expressly or inherently, in a single prior art reference or embodied in a single prior art device or practice. *See In re Paulsen*, 30 F.3d 1475, 1478 (Fed. Cir. 1994); *Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1565 (Fed. Cir. 1992). There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of invention. *See Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991). A finding of anticipation "is not supportable if it is necessary to prove facts beyond those disclosed in the reference in order to meet the claim limitations." *Id.*

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Absence of any claim element from the reference negates anticipation. *See Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1571 (Fed. Cir. 1986).

"[A] prior art reference may anticipate when the claim limitations not expressly found in that reference are nonetheless inherent in it." *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349 (Fed. Cir. 2002). The missing element must be "necessarily present in the thing described in the reference," and "be so recognized by persons of ordinary skill." *Rosco, Inc. v. Mirror Lite Co.*, 304 F.3d 1373 (Fed. Cir. 2002) (citing *Continental Can Co. v. Monsanto Co.*, 48 F.2d 1264, 1268 (Fed. Cir. 1991)).

An anticipatory reference must also enable a skilled artisan to make and use the claimed invention. *See Bristol-Myers Squibb Co. v. Ben Venue Laboratories, Inc.*, 246 F.3d 1368, 1374, 58 U.S.P.Q.2d 1508 (Fed. Cir. 2001) (citing *In re Donohue*, 766 F.2d 531, 533, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985)). "To be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without "undue experimentation." *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993).

A rejection based on 35 U.S.C. §102(e) can be overcome by persuasively arguing that the claims are patentably distinguishable from the prior art, and by amending the claims to patentably distinguish over the prior art. MPEP 706.02(b).

Applicant urges that the pending claims are patentably distinguishable from the prior art because the '641 Patent does not teach or suggest every limitation in every claim and the missing claim elements are not necessarily present in the electrodes described in the '641 Patent and would not be so recognized by persons of ordinary skill.

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Applicant urges that the '641 patent does not teach or suggest the particulate lithium titanate intercalation compound of the present invention as claimed. The disclosure of the present invention teaches the synthesis of, and claims, a lithium titanate intercalation compound having an average primary particle size of less than 100 nanometers, including lithium titanate defect spinel ( $\text{Li}_4\text{Ti}_5\text{O}_{12}$ ) and similar compounds comprising minor amounts of functional substituents, such as alkaline earth and transition metal ions. [Para. 0008].

In contrast, the disclosure of the '641 patent nowhere teaches or suggests synthesis or use of a lithium titanate intercalation compound having an average primary particle size of less than 100 nanometers. The only lithium-titanium compound specifically disclosed in the '641 patent is lithium titanium disulfide ( $\text{LiTiS}_2$ ), not lithium titanate, and such mention was in the "background" section of the disclosure, not in the description of the claimed invention. [col. 1, line 42]

Unlike Applicant's application, which describes a lithium titanate intercalation compound, the '641 patent teaches the manufacture and use of a precipitation product derived by mixing a first solution comprising dissolved forms of a transition metal and a first polymer with a second solution comprising dissolved forms of an alkali metal and a second polymer. In the resulting precipitate, the transition metal moiety is structurally amorphous, [col. 2, lines 23-40], and consists of a complex of transition metal, polymer and alkali metal. [col. 4, lines 60-66] Moreover, although the '641 patent mentions in passing that the transition metal used in making the structurally amorphous precipitate complex may be titanium [col. 5, lines 15-17], none of the

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examples in the disclosure describe the use of, or any data related to, titanium. [See col. 6, line 13 to col. 10, line 64]

Although the Examiner cites the x-ray diffraction pattern in Figure 2 of the '641 patent as evidence of a particle size of less than 10 nanometers for the Striebel material, the material whose X-ray pattern is shown in the '641 Patent is not a lithium titanate compound. Curves A and B of Figure 2 correspond to samples 2A and 7B of Table 1 of the '641 patent. [col. 3, lines 19-23] As can be seen in Table 1 of the '641 patent, those samples consisted of manganese-lithium-polyethylene oxide complexes. [Col. 6, lines 46-62]. The reference deduces that the size of any crystalline component therein is less than about 10 nm from the lack of definition in the X-ray pattern.

Applicant urges that this disclosure does not disclose, teaches or suggest a lithium titanate intercalation compound having an average primary particle size of less than 100 nm. Even assuming that the '641 Patent teaches that the amorphous manganese-lithium-polymer complex contains crystalline particles less than 10 nanometers in diameter, that does not disclose, teach or suggest the synthesis or use of lithium titanate particles of less than 100 nanometers.

Second, for the Examiner to find that an invention is *prima facie* obvious, there must be a basis in the art for combining or modifying references (MPEP 2143.01), there must be a reasonable degree of predictability of success in the proposed modification or combination (MPEP 2143.02), and the prior art must teach or suggest every limitation in every claim (MPEP 2143.03). Moreover, for a reference to be a proper obviousness reference, it must contain (1) detailed enabling methodology for practicing the invention without undue experimentation; (2) a suggestion to modify the

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prior art to practice the claimed invention; and (3) evidence suggesting that the modification would be successful in achieving the invention. *In re O'Farrell*, 853 F.2d 894, 901, 7 U.S.P.Q.2d 1673, 1681 (Fed. Cir. 1988). See also *In re Nunberg*, 33 U.S.P.Q.2d 1953 (Fed. Cir. 1994); *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Applicant urges that as discussed above, because the '641 Patent does not teach or suggest every limitation in any of pending claims 8-11, the product of the '641 Patent is not the same or similar to the product of the present invention. In addition, Applicant urges that the Examiner has not established either a basis for modifying the Striebel reference or a reasonable degree of predictability of success in any proposed modification of Striebel that would lead a person of skill in the art to achieve the invention described and claimed in the present application.

As for product by process claim 9, Applicant disagrees with the Office action's conclusion that the process limitations do not merit patentable weight. Applicant respectfully urges that as explained in paragraph [007] of the specification, the product of the present invention is different from the prior art as a result of the process. As disclosed, the present invention resolved the problem in the prior art, i.e., that synthesized lithium titanate particles continue to enlarge during prolonged annealing. Unlike the prior art, the process of the present invention yields consistent nanostructure lithium titanate product, provides both materials and electrochemical cells that exhibit remarkable improvement over the prior art in high cycle rate capacity, and provides magnitude increases in economies of time and energy.

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Applicant therefore respectfully requests that the Examiner also withdraw the obviousness ground for rejection.

Since there is no prior art that teaches or suggests the claimed invention, Applicant respectfully requests that the Examiner withdraw all objections to and rejections of the present invention.

Applicant urges that this application is now in condition for allowance and earnestly solicits early and favorable action by the Examiner. If the Examiner believes that issues may be resolved by a telephone interview, the Examiner is respectfully urged to telephone the undersigned at (973) 597-6170. The undersigned also may be contacted via e-mail at [blubit@lowenstein.com](mailto:blubit@lowenstein.com).

#### AUTHORIZATION

The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. 501,358.

Respectfully submitted,

Lowenstein Sandler PC

By:

Date:

8/22/05

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